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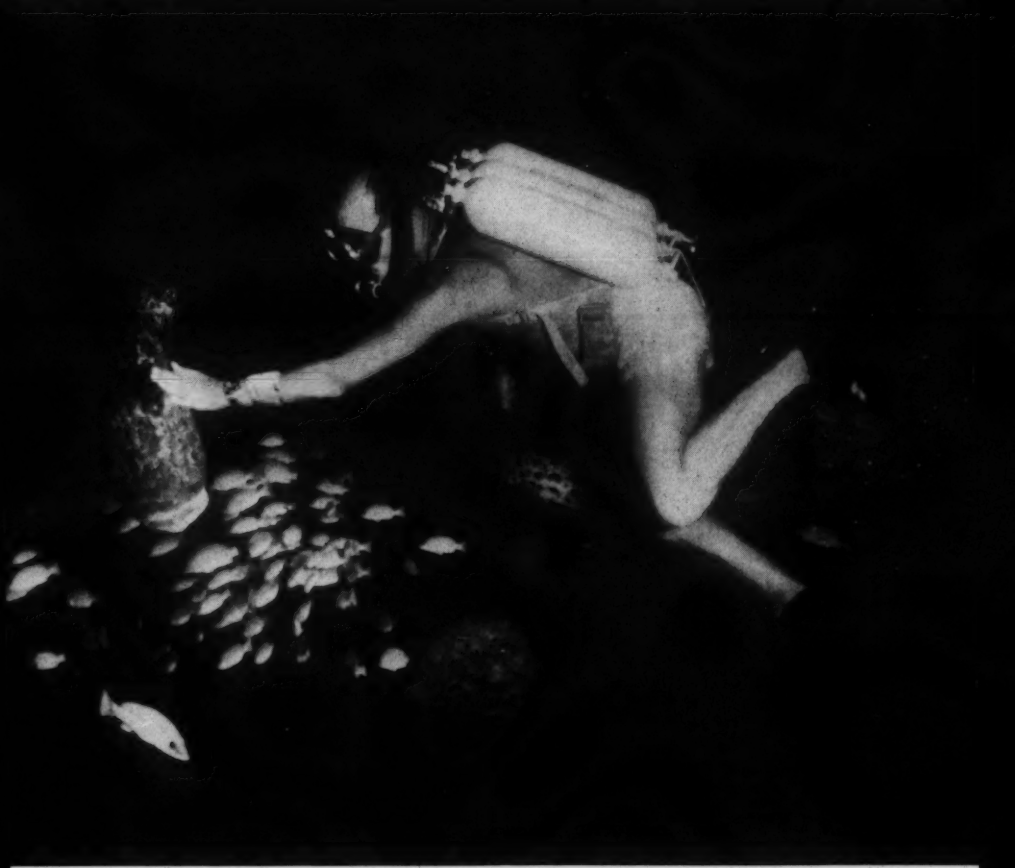

PIERRE GOUPIL

**National Geographic staffman Luis Marden takes time out from underwater photography to pat a 60-pound grouper that adopted him. Other fish friends—and foes—appear on pages 342-343**

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1958? It is a time when the world studies itself. The word "geophysics" implies "science of earth." Results of scientific programs will stream from every continent, from nations whose political aims may be utterly opposed. Every finding will increase man's common fund of knowledge about his home planet.

The first International Polar Year (1882-83) increased man's understanding of the origins of weather and the northern lights (which some Eskimos regard as fearsome spirits playing a game like soccer with a walrus skull). The second International Polar Year (1932-33) helped bring better radio reception into homes. Findings inspired many electronic advances, among them radar.

The present International Geophysical Year spreads farther afield. At 10,700 feet in Peru's Andes, scientists from Peru, Chile, Colombia, and Bolivia prepare equipment to study nighttime airglow in the upper atmosphere. At Fort Churchill, on Hudson Bay, looms a tower to blast scores of rockets up to 250

NEWMAN BUMSTEAD, NATIONAL GEOGRAPHIC STAFF

miles (GSB, Apr. 15, 1957). Scientists will move from American, Danish, and Canadian stations by dog sled, ship, and plane to attack mysteries of the Greenland Icecap and of polar Canada.

Magnetic observations will be made from the Shetland Islands, southern Scotland, the Falkland Islands, and Antarctica. Danes will photograph the northern lights from Greenland. Czechs have begun to study effects on the atmosphere of the sun's rays and of meteors.

PAN AMERICAN WORLD AIRWAYS

**AEROBEE ROCKET (top) was designed to measure energy within the glowing aurora. Northern lights (above) have their southern counterpart, the aurora australis**

"Is the climate of the earth changing? Are glaciers receding? Will melting ice sheets someday flood coastal lands? Where do cosmic rays come from and what is their nature? What causes the aurora? What is the relationship between sunspots and solar flares and long-range radio transmissions?"

Dr. Joseph Kaplan, chairman of the United States National Committee for IGY, thus poses some of the innumerable questions IGY seeks to answer. The whole program is divided into 12 main fields of research.

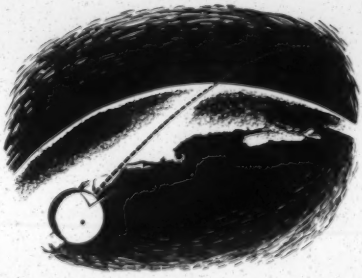
Future issues of the *National Geographic Magazine* and the *Geographic School Bulletins* will publish illustrated reports of these studies.



UMI

ANDREW H. BROWN, NATIONAL GEOGRAPHIC STAFF

# IGY – *What It Means*



A penquin flaps greetings to the burly ice-breaker, *Glacier*, nudging against Antarctica's wastes. This vessel serves scores of scientists, stationed at the white continent to play a part in IGY—International Geophysical Year.

In a few months, a metal basketball, crammed with instruments, will scream into space to circle the earth. IGY scientists will track its path and study its electronic findings.

Millions of words have been written to describe these spectacular projects—Operation Deep Freeze in Antarctica, and the forthcoming earth satellite program. As thousands know, they are part of IGY's scientific studies. But tens of thousands do *not* realize that many other programs are part of IGY. Scientists are taking stations in breathless tropics, the brazen heat of deserts, on lonely mountains and seas, for IGY has world-wide scope.

What is the "year" that lasts 18 months—from July 1, 1957, to December,

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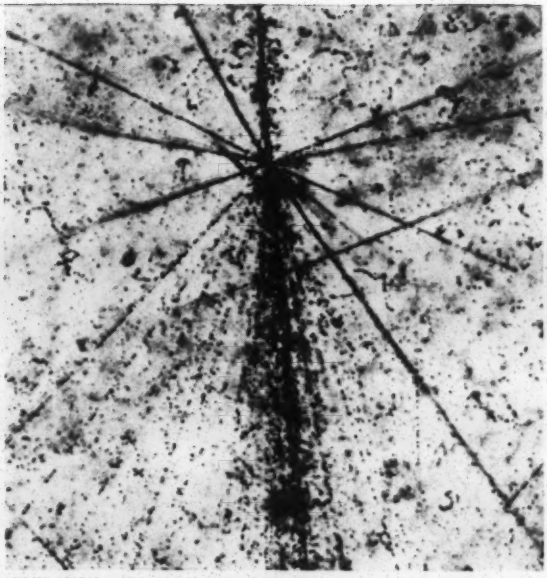


HERMAN YAGODA, NATIONAL INSTITUTES OF HEALTH

**SPLAT! A cosmic ray smacked photographic plate, above, etching its collision on silver bromide and gelatin. A balloon hauled the plate to 100,000 feet where this cosmic bullet struck. Top vertical line is ray's path. Diverging lines are particles of an atom that got in the way. Thus do IGY scientists study behavior of cosmic rays.**

BRADFORD WASHBURN

range forecasts, scientists gather data in Antarctica where much of the world's weather is made.

### Cosmic Rays

See picture at left.

### Geomagnetism

Earth's magnetic field will be studied at eight United States stations, 12 outside the country.

### Oceanography

Almost nothing is known of deep ocean currents, yet they may have great effect on long-range weather predictions. Island stations will check ocean currents, sea levels, the shape of the ocean floor.

### Seismology

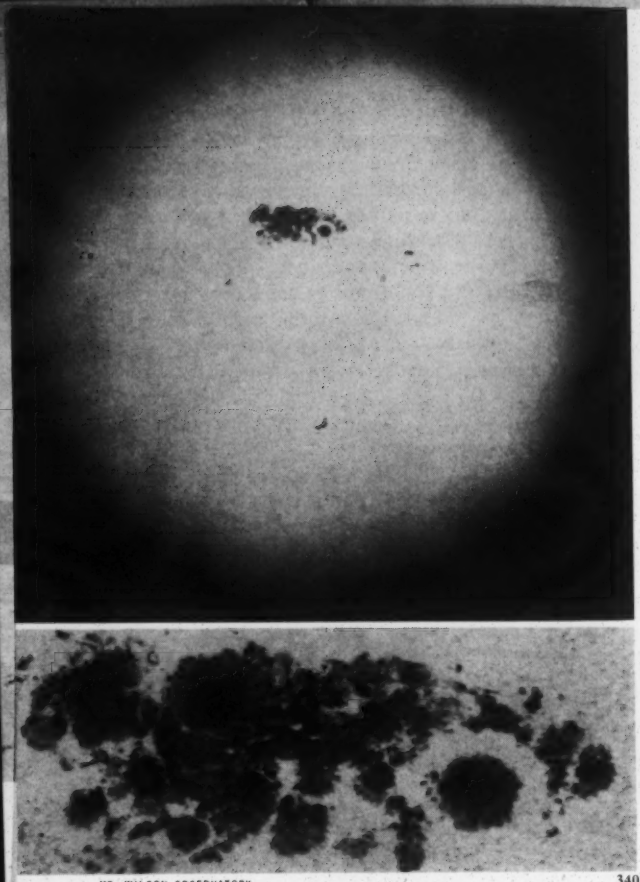
Man has barely glimpsed into Earth's interior. IGY may produce better understanding of the "underworld," spawning ground of volcanoes and earthquakes.

### Rockets and Satellites

A number of man-made satellites are scheduled for launching during IGY. (See GSB, Oct. 22, 1956).

### Glaciology (left)

Glaciers cover about a tenth of earth's land surface, hold about one per cent of its water. Their changes are vital clues to weather trends, past and future. Scientists will examine such glaciers as Donjek (left), below Canada's Mt. Logan, and assess changes in size.



MT. WILSON OBSERVATORY

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## IGY and The National Geographic

The National Geographic Society has the same general aim as IGY—the study of man's environment. During the past half century The Society has sponsored 145 expeditions and research projects devoted to this end. The Cumulative Index of the National Geographic Magazine reveals scores of articles and maps relating to the studies being undertaken during IGY. Following are recent references.

April, 1957, "Rockets Explore the Air Above Us" (school price, 55¢); August, 1956, "All-out Assault on Antarctica" (out of print; refer to your library); April, 1956, "Space Satellites, Tools of Earth Research" (75¢); February, 1956, "The International Geophysical Year" (75¢); January, 1956, "Wringing Secrets from Greenland's Icecap" (75¢); January, 1953, "Trailing Cosmic Rays in Canada's North" (75¢); January, 1952, "Our Home-town Planet, Earth" (75¢); November, 1947, "Unlocking Secrets of the Northern Lights" (75¢).

**Brief summaries of IGY projects follow:**

### Solar Activity (left)

Bases in the United States, Alaska, Europe, Australia, and Japan will keep track of sunspots, outbursts of sun's energy, flares from the sun's surface. Sunspots (left) will be at their peak during IGY. Each spot shown in the enlargement is big enough to swallow Earth.

### Gravity

Gravity varies all over our irregular globe. Scientists will measure it at the Poles and from ocean bottoms.

### Aurora and Airglow

Cameras fitted with "all sky" lenses will photograph the familiar, yet mysterious, rays that shoot upward in far northern and southern skies. Photoelectric equipment will measure radiation of airglow, the sky's weak light.

### Ionosphere

Radio waves bounce off this layer 50 to 250 miles above Earth. Rockets will pierce it and record effects.

### Longitude and Latitude

Errors still exist in calculating distances and finding exact locations on this globe. IGY scientists seek to reduce such errors.

### Meteorology

Weather affects everyone. To improve long-

MARINE STUDIOS

above, can crack the shell of a giant sea turtle, make mincemeat of an arm or leg.

Peering with surly eye from an underwater den, the moray eel, below, can spell sudden trouble. Various kinds of morays haunt the world's seas. Most have strong jaws and vicious, sharp teeth ready for battle. Ten-foot morays have been reported.

But the world's oceans, lakes, and rivers swarm with the friendlier sorts. The hungry fellow (far right), a large-mouthed bass named "Billy the Kid," grew fond of daily gifts of frogs served up from the dock at Spider Lake, Michigan. He returned year after year. The 20-pound schnapper at the left was so tame he didn't even mind being lifted out of his New Zealand home waters.

Some fish go for a handout—others would as soon take a hand *off*.—J.A.

MARINE STUDIOS

JACK VAN COEVERING FROM BLACK STAR

ERNEST PALINKAS, PIX

# Who Swims There—

## *Friend Or Foe?*

Skin divers, beware! The reddish-striped lionfish, left, drifting among the tropical coral reefs, is beautiful but dangerous. A swat from its spines deals venom that reportedly can kill humans.

Meet some other members of the underwater rogue's gallery. Dashing through the depths with bursts of phenomenal speed is the great barracuda, "Tiger of the Seas," lower left. Bold and vicious, its razor-sharp pointed teeth have brought grief to many a swimmer trespassing in its home waters—from off the West Indies south to Brazil. Though the shark ranks as public enemy No. 1, the majority of nearly 250 species have never been known to attack man. But don't take chances. Teeth of the tiger shark,

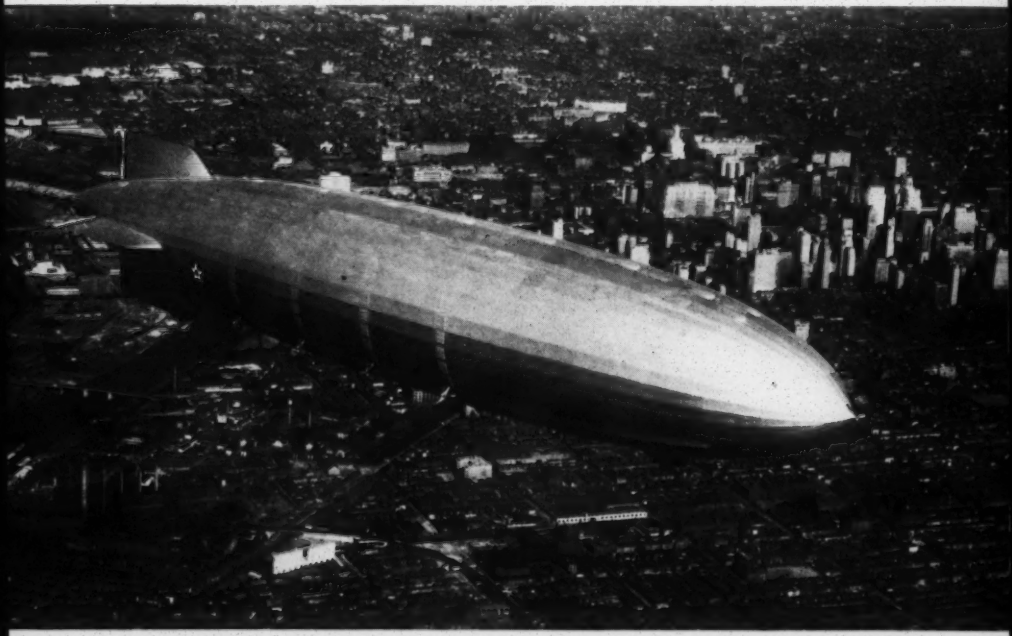
MARINE STUDIOS

NEW ZEALAND EMBASSY

By 1862, Britishers Glaisher and Coxwell rode altitudes of nearly seven miles in a free balloon. They were first to probe the stratosphere's threshold.

Back then, balloons served thrill seekers mostly. A deadlier mission lay at hand. Thaddeus Sobieski Coulincourt Lowe turned from flight stunts to a new and hair-raising career as a balloon observer in the Civil War. He impressed the idea upon President Lincoln. In 1861, he sent the President the first air-to-ground telegraph message. Lowe reasoned that a man in a balloon could see more of enemy movements than a man on the ground, and his balloons served the Union from 1861 into 1863.

When hostile armies surrounded Paris in the Franco-Prussian War, balloons —and carrier pigeons—helped maintain communications. Air-minded Germany



U. S. NAVY DEPARTMENT

entered World War I with six primitive military dirigibles—balloons built on a rigid elongated framework with propellers to power them. Before the conflict ended, she had built 88 Zeppelins. Each grew more efficient in order to survive improved anti-aircraft guns and fighter planes. The last Zeppelin stretched 750 feet, a monster outmeasuring the 555-foot Washington Monument.

The United States caught the dirigible bug and built several, including the 785-foot *Akron*, shown above over Philadelphia. Only small blimps now remain in American air; most of the big ships crashed. Germany produced the ultimate in dirigibles—the 803-foot *Hindenburg*. A luxury liner of the sky, she crossed the Atlantic many times carrying passengers in smooth comfort. Lighter-than-air transport seemed to have reached perfection. Then, just 20 years ago, the *Hindenburg* crumpled in flames while landing in New Jersey.

With the *Hindenburg* died the future of dirigibles. But balloons, the oldest means of flight, still have jobs to do, even in this age of rockets.—S. H.

***National Geographic Magazine***—Feb., 1957, "To 76,000 Feet by *Strato-Lab* Balloon" (school price, 55¢); Jan., 1936, "Man's Farthest Aloft" ($1.00).



UMI

# GOING UP

**Balloons first took man off the ground. They still point the way to new heights.**

NOVEMBER 8, 1956. All eyes peered upward through the South Dakota daybreak. Bulging with 40,000 cubic feet of helium, the Navy's *Strato-Lab* balloon soared into the upper atmosphere. Inside the pressurized gondola, altimeters wound up to 76,000 feet—a new, though unofficial, record for a man-carrying balloon.

Nearly 21 years earlier, the same Dakota skies were pioneered to 72,395 feet by balloon *Explorer II* (left), high-altitude fact finder for the National Geographic Society and U.S. Army Air Corps. Detailed data from the flight helped spell success for last autumn's ascent.

Now serving science as the best means of holding a position in the upper air, balloons were man's first practical means of getting a few feet off the ground. Thirteenth century Roger Bacon advocated filling a hollow globe with "ethereal air or liquid fire" for upward jaunts. Thus he voiced the basic principle that an airtight bag filled with gases will rise.

Frenchmen were excited in 1783 when the Montgolfier brothers floated a big bag filled with smoke and hot air of a straw fire. People believed that some mysterious vapor peculiar to burning straw lifted the bag, realizing only later that heated air performed the trick. Jean Francois Pilatre de Rozier rescued his name from possible obscurity as a court official of King Louis XVI by becoming the first human balloonist. He daringly soared to 500 feet in 1783. That year, hydrogen was first used in a balloon. A rooster, a sheep, and a duck were sent aloft—the rooster probably standing the best chance for survival in case of mishap. André Jacques Garnerin showed how to survive by making the first parachute leap in 1797 over Paris.

George Washington himself watched Francois Blanchard ascend from Philadelphia in 1793.



M/SGT. G. B. GILBERT © N.G.S.

J. ALLAN CASH FROM EUROPEAN

**THRONGS fill shop-lined Mousky street, above, in Cairo's Old Quarter, where hammers of metal craftsmen, right, work fine patterns into trays**

The queen pressed fingers to her temples to ease the ear-splitting clatter of boulevard traffic. Trams lurched past, loaded with Nubians, Egyptians, Turks, and Europeans.

"Dear Isis preserve me," Cleopatra gasped as a gleaming Jaguar whipped past. A camel nearly bumped her into a newspaper stand. Donkey bells tinkled, and from somewhere drifted the voice of a muezzin calling Moslems to prayer.

Cleopatra marveled at gleaming buildings, window-shopped at modern stores, and joined a group of people from America (wherever that was) being hustled along by a guide. She understood little, being more interested in differences between natives and strangers.

"They must have a different god from the Moslems," thought Cleopatra. Suddenly the Citadel loomed ahead, taking her breath away. . . .

HAMILTON WRIGHT

"Saladin built the Citadel during the Crusades, when Moslem was fighting Christian," the guide was saying.

In the darkness of the Old Quarter, where crowded streets narrow down to alleyways with overhanging balconies and barred windows, life hasn't changed since the Middle Ages, but how was Cleopatra to know? To her it seemed a strange place of the future. She watched tinsmith and coppersmith, and paused at booths displaying rugs and silk brocades. Only the scent of perfumes stirred her memory.

At one stall, a trinket caught her eye. "What is this, vendor?" she demanded in queenly manner. "It's a bracelet, lady, made in the style of ancient Egyptians. Why, Cleopatra herself might have worn it . . ."

Fuming at the cheap imitation, Cleopatra moved on to the banks of the Nile. As always, the river calmed her and she sadly returned to the Pyramids.

"What did you find, Queen?" asked the Sphinx.

"Nobody recognized me and nobody knows anything about my glorious reign."

"Don't pout," said the Sphinx, "and don't blame them. After all, when you lived, how much did you know about the people who built me?"—



UMI

HAMILTON WRIGHT

# CAIRO

**"What would happen," the core teacher asked, "if Cleopatra took earthly form and returned to Egypt today?" The class was quiet, plainly challenged by the thoughts aroused. Next day Mary put this on teacher's desk.**

THE Nile was still a blue-green serpent twisting through barren desert. But little else was the same.

Ah, there are the Pyramids, and the Sphinx, thought Cleopatra, recognizing old friends. "But where are Memphis and Thebes?" she demanded. "And what is that flattish sprawling city doing over there at the head of the delta?"

"Why, that's Cairo," said the Sphinx. "It's the capital of Egypt today, the biggest city in Africa. It was founded quite recently—in the 7th century—long after you held the asp to your bosom."

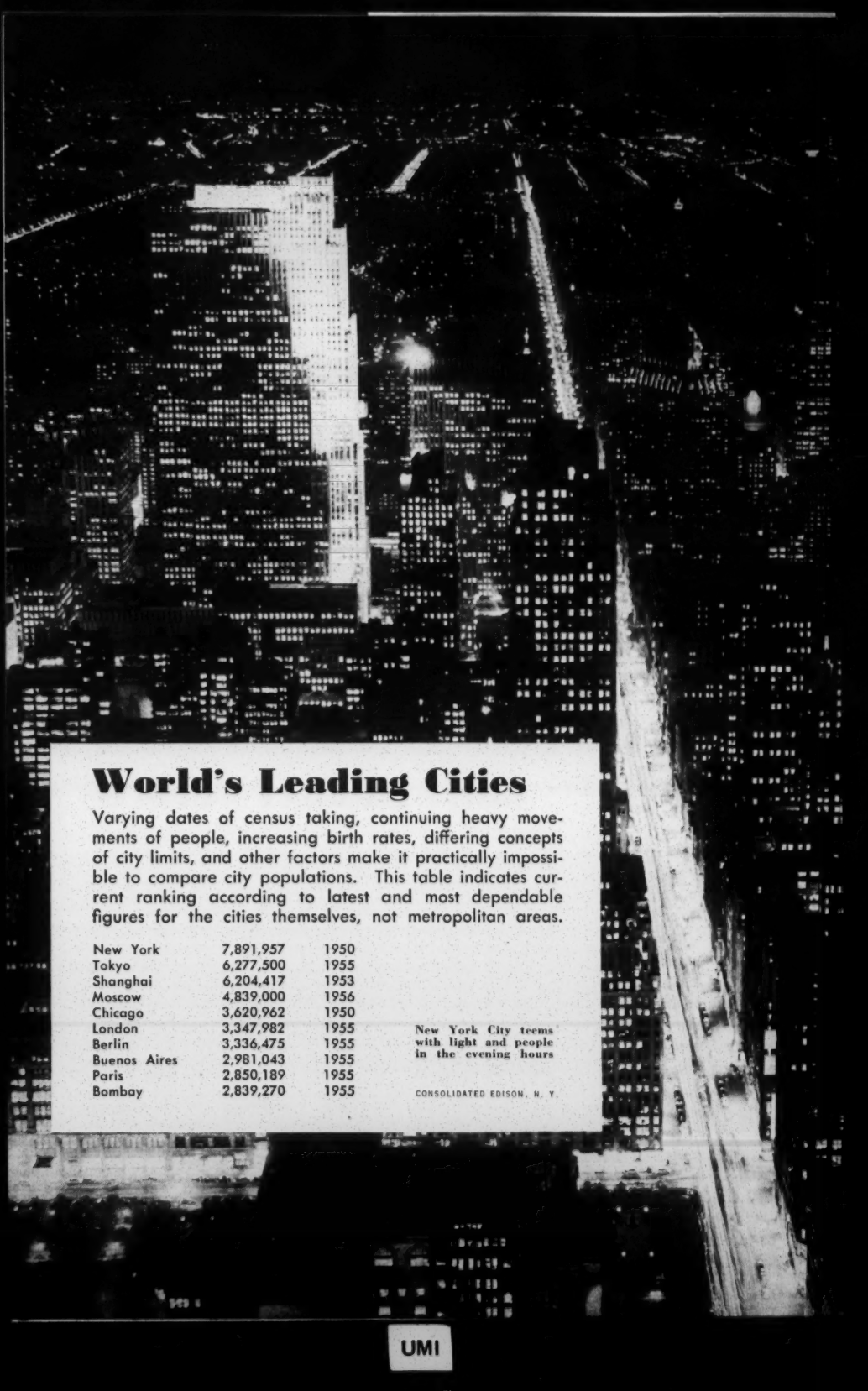
"But those ridiculously slender towers everywhere, what are they?"

"Those are minarets. They rise beside mosques, temples of the new religion."

"What! Have my people forgotten Osiris?"

"Go and see for yourself," said the Sphinx, becoming bored.

Everywhere she went, Cleopatra was mistaken for a dancing girl. She glanced scornfully at sedate Moslem women, swathed in yards of cloth and veiled in black. But they obviously could stand noise better than she could.



# World's Leading Cities

Varying dates of census taking, continuing heavy movements of people, increasing birth rates, differing concepts of city limits, and other factors make it practically impossible to compare city populations. This table indicates current ranking according to latest and most dependable figures for the cities themselves, not metropolitan areas.

| | | |
|---|---|---|
| New York | 7,891,957 | 1950 |
| Tokyo | 6,277,500 | 1955 |
| Shanghai | 6,204,417 | 1953 |
| Moscow | 4,839,000 | 1956 |
| Chicago | 3,620,962 | 1950 |
| London | 3,347,982 | 1955 |
| Berlin | 3,336,475 | 1955 |
| Buenos Aires | 2,981,043 | 1955 |
| Paris | 2,850,189 | 1955 |
| Bombay | 2,839,270 | 1955 |

New York City teems with light and people in the evening hours

CONSOLIDATED EDISON, N. Y.

UMI